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UNITED STATES DEPARTMENT OF AGRICULTURE
OFFICE OF PUBLIC ROADS AND RURAL ENGINEERING
Washington, D. C.

FIELD LETTER NO. 29.
July 15, 1917.

Logan Waller Page, Director.

P. St.J. Wilson, Chief Engineer; J. E. Pennybacker, Chief of Management;
Samuel Fortier, Chief, Irrigation Investigations; S. H. McCrory, Chief,
Drainage Investigations; E. B. McCormick, Chief, Rural Engineering;
Prevost Hubbard, Chief, Tests.

FEDERAL AID.

Circular No. 65, Office of the Secretary, containing the Federal Aid Road Act and the rules and regulations issued by the Secretary pursuant thereto, and revised so as to embody all amendments which have been made to the rules and regulations, is available for distribution.

Twenty-eight new project statements were submitted in June as follows:
Alabama Nos. 2, 3, 4, 5, 6, 7, 8 and 9; Kentucky No. 1; Maryland No. 2;
Massachusetts Nos. 1, 2 and 3; Michigan No. 3; Minnesota Nos. 8 and 12;
New Hampshire Nos. 4, 5, 6, 7, 8 and 9; North Carolina No. 12; Ohio No. 3;
Vermont Nos. 1 and 2; and Virginia Nos. 2 and 3.

Projects approved by the Secretary in June: Maine No. 2; Maryland Nos. 1 and 2; Minnesota Nos. 1, 2, 5 and 8; and North Carolina No. 3; Virginia No. 1.

Projects transmitted in June by the Management Division to the Secretary: Alabama, Nos. 1, 2, 4, 5, and 6; Georgia, Nos. 1, 3, 4, and 5; Kentucky, No. 2; Maine, No. 2; Maryland, Nos. 1 and 2; Michigan, No. 2; Minnesota, Nos. 1, 8, and 9; New Hampshire, Nos. 2, 3, 4, 5, 6, 7, 8, and 9; North Carolina, No. 3; Ohio, No. 3; Virginia, Nos. 2 and 3; Washington, No. 2.

Project agreements executed by the Secretary in June: North Carolina, No. 1.

Maryland No. 1 project agreement is with the highway department for execution, and project agreements Maine No. 1; New Hampshire, No. 1; North Carolina No. 2, have been prepared for submission to the respective highway departments.

Plans and specifications for Maryland No. 2 have been submitted to the Chief Engineer with recommendation for approval, but further action thereon was suspended upon the request of the State Roads Commission, pending determination as to new location for the road on account of the cantonment to be built at Annapolis Junction.

Pennsylvania projects 1, 2 and 3 were readvertised June 12; one bid received on No. 1 was rejected; none was received on Nos. 2 and 3.

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The State Road Commission of West Virginia has been reorganized and moved from Morgantown to Charleston. A map showing a tentative system of highways to be improved with Federal Aid during the 5-year period was submitted to the District Engineer.

The State of Oregon has passed a \$6,000,000.00 bond issue, and has submitted its program of work which has been approved by the Secretary.

Five-year program maps for the States of Utah and Wyoming were transmitted to the Washington Office.

Four project statements were submitted by the State of Wyoming to the District Engineer.

The principal work in the 5th district for June consisted of assisting the States in preparing programs and selecting projects, with the result that satisfactory project statements may be expected in the near future from Missouri, Iowa and Kansas. District Engineer Wonders reports that Nebraska's program probably will be submitted soon.

District Engineer Bullen spent two days in Florida conferring with the State Highway Commissioner regarding details of Federal Aid work, and inspecting proposed projects. He also assisted the Alabama State Highway Department in preparing 9 project statements, reviewing State specifications, etc.

Inspections and reports on proposed Federal Aid projects in Tuscaloosa, Sumpter, and Lee counties, Alabama, were made by Mr. Crossland.

W. H. Rhodes, Highway Engineer, with the State Highway Engineer of Mississippi, inspected proposed projects in Scott, Rankin, Newton, Green, Perry, Clarke, Hinds, and Itawamba counties, Mississippi, and inspected and reported on proposed projects in Coffee County, Alabama.

National Forest Roads.

In District 1, field work was completed on the Eugene-Florence, Prineville-Mitchell, Anna Creek, and Enterprise-Flora roads, in Oregon.

District Engineer Hewes examined three National Forest projects in Oregon, one in Washington and two in Idaho.

R. M. Gaumaer and B. F. Beezley, Superintendents Road Construction, were assigned to reconnaissance surveys of Pendleton-La Grande and McKenzie roads, in Oregon.

The reconnaissance survey of Blewett Pass road, Washington, was completed by Mr. C. W. Cheatham, S. R. C.

W. H. Waugh, S. H. E., has been assigned to Alaska in connection with roads in National Forests, and is en route to Ketchikan.

Requests have been received by District 2 for reconnaissance surveys of one road in the Datil and one in the Lincoln National Forests, and for preliminary investigations of 3 roads in the Alamo National Forest, New Mexico.

V. L. Bonner, S. R. C., has been assigned to supervise construction work on the Salmon River road in the Klamath National Forest, California.

T. C. Peterson, J. H. E., inspected the Wind River project in the Washakie and Teton National Forests, Wyoming, and will be in charge of location survey thereof authorized June 18. This project covers about 75 miles of road over the Teton Mountains, and will provide a new entrance to the southern boundary of the Yellowstone National Park.

Cooperative agreement for the location survey and construction of the Belt Creek project in the Jefferson National Forest, Montana, has been executed, and the survey authorized. The agreement contemplates location and construction of 18 miles of earth road, estimated cost being \$80,000.00.

R. A. Brown, S. R. C., is in charge of construction on the Teton Pass National Forest road, in Wyoming.

Location surveys of Bernice and Seeley Lake 10 per cent projects, in the Deerlodge and Missoula National Forests, Montana, were completed by H. A. Calkins, S. R. C., and A. V. Williamson, S. R. C., respectively. Mr. Calkins is now engaged on the location survey of the North Fork project, and Mr. Williamson is in charge of the surveys on the Yaak Valley project, Montana.

A request for preliminary investigation of the Greenlee-Bedford Road in the Natural Bridge National Forest, in Rockbridge, Botetourt, and Bedford counties, Virginia, has been received by District Engineer Bishop.

CONSTRUCTION.

Object-Lesson Roads.

C. T. Harrison, S. R. C., completed an object-lesson road 1600 feet long, near Wetumka, Oklahoma. Upon request of the County Commissioners he undertook the improvement of another section of road three-eighths mile long, which he completed June 28.

Experimental Roads.

D. G. Haire, S. R. C., who has been on furlough since December last, reported at the Washington Office and has been assigned to experimental maintenance work in Maryland and Virginia to assist J. H. Eldridge, S. R. C.

Post Roads.

Construction work on the Dubuque Post Road, Iowa, which has been in charge of H. H. Lotter, S. H. E., now is in charge of H. S. Parry, J. H. E., Mr. Lotter having been assigned to cantonment work.

County Road Systems.

District Engineer Fauntleroy spent considerable time in Austin advising with the State Highway Commission of Texas on county road systems and attended a meeting of the Texas Good Roads Association at Mineral Wells, June 20-22.

B. H. Burrell, S. H. E., completed reports on county road systems in Dickens, Kent, Lubbock and Floyd counties, made inspection and report on proposed road construction in Travis County, and inspected roads in Fannin County, Texas. The Fannin County report has not been submitted as the County Auditor has not furnished certain related data requested.

W. A. Crossland, S. H. E., spent ten days inspecting Maury County, Tennessee, and preparing report.

District Engineer Sweetser received request from the Supervisors of Calaveras County, California, for assignment of an engineer to cooperate in making reconnaissance estimate of cost of improving certain roads in their highway system.

CANTONMENT.

Owing to the building of roads about cantonment camps throughout the United States, the War Department has called on this Office for 16 engineers, and the following have been assigned to camps under the direction of Constructing Quartermasters:

J. J. Tobin,	assigned to	Ayer, Massachusetts,
R. F. Eastham,	"	" Petersburg, Virginia,
H. S. Fairbank,	"	" Admiral, Maryland,
B. F. Heidel,	"	" Wrightstown, New Jersey,
R. H. Harrison,	"	" Little Rock, Arkansas,
E. S. Alderman,	"	" Ft. Sam Houston, Texas,
B. F. Burrell,	"	" Ft. Riley, Kansas,
W. A. Crossland,	"	" Atlanta, Georgia,
H. H. Lotter,	"	" Des Moines, Iowa,
W. L. Spoon,	"	" Columbia, South Carolina,
V. E. Towles,	"	" Chillicothe, Ohio,
W. F. Brooks,	"	" Louisville, Kentucky,
J. T. Pauls,	"	" Rockford, Illinois,
U. S. Marshall,	"	" American Lake, Washington,
E. S. Fitch,	"	" Battle Creek, Michigan,
A. S. Brainard,	"	" Yaphank, Long Island,

1. The Commission has no power to make any such order.

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Assistant District Engineer Finch visited American Lake, Washington, to make examination of the cantonment site and arrange for cooperation with the Quartermaster's Department.

District Engineer Sweetser inspected cantonment site at Linda Vista, California.

A preliminary inspection was made of the road between Des Moines and the new National cantonment, and it is expected this will be one of the first projects to be submitted by the State of Iowa.

District Engineer Fauntleroy was in San Antonio, Texas, June 29, advising with the Quartermaster in charge of cantonment construction at Camp Wilson, just outside of San Antonio.

Inspections of cantonment sites in Canada were made by District Engineer Bishop, and in Virginia by J. C. Carpenter, Drainage Engineer.

District Engineer Miller inspected U. S. Army cantonments at Ayer, Massachusetts, Yaphank, Long Island, and Wrightstown, New Jersey, and made estimates for construction work in the Ayer and Yaphank cantonments.

ECONOMICS.

Economic Highway Survey.

An economic highway survey in cooperation with the Maryland State Road Commission was begun in June, and had progressed considerably at the close of the month. Messrs. R. F. Eastham, J. J. Tobin, and W. E. Rosengarten were assigned to this project as engineers, and I. W. Hall as draftsman. Maps are being prepared, showing location, types, grades, conditions, and traffic importance of highways, the location of road materials, the types, dimensions, and load capacity of bridges, character of products hauled on the roads, etc.

Statistical Work.

Circular No. 73, containing information relating to automobile registrations and revenues has been issued.

Management Changes.

Arrangements were made for installing bookkeepers in Districts 1, 2, and 3, at Portland, Berkeley, and Denver, respectively, with a view to handling fiscal matters for those districts at the district headquarters instead of from the Washington office, general supervision, however, remaining as before.

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TESTS AND RESEARCH.

Administration.

The personnel of the division has been increased by the appointment of R. B. Ferh as assistant engineer of tests on Soil Pressure Investigations, under Mr. Goldbeck. Two new student assistants were also appointed, one for service in the Chemical Laboratory and one for the Physical Laboratory. Richard H. Lewis was granted 3 months furlough to attend the officers' training camp at Des Moines, Iowa. One student assistant resigned during the month to take a position in the War Department.

Messrs. Hubbard and Jackson attended the annual meeting of the American Society for Testing Materials at Atlantic City, New Jersey, and participated in business meetings of the society as well as in various committee and sub-committee meetings.

Routine Tests and Analyses.

Twenty-eight samples, 18 of which were bituminous materials and the remainder cement concrete and soil were examined in the Chemical Laboratory in June. One hundred samples of rock, sand, gravel, etc., were examined in the Physical Laboratory and 94 samples were examined and classified in the Microscopic Laboratory.

Research upon the Properties of Dust Preventatives and Road Binders.

Messrs. Hubbard and Reeve visited a number of laboratories in New York City for the purpose of obtaining information on certain research apparatus to be installed in our own Chemical Laboratory. As a result it has been decided to install an ultra violet ray apparatus, a large constant temperature bath, a binocular microscope and a photomicrographic apparatus for use in the investigation of the properties of bituminous materials. Certain modifications of the experimental topping plant at Arlington Farm are in the course of construction and it is hoped that the modified apparatus will dehydrate crude petroleum satisfactorily so that a study of the effect of manufacturing processes upon petroleum can be carried on in the experimental refining plant.

A paper upon "A New Instrument for Determining the Consistency of Viscous Liquid Bituminous Materials" was presented before the American Society for Testing Materials at Atlantic City by Mr. Hubbard.

A set of typical specifications for all types of bituminous road materials has been prepared and will be submitted to various manufacturers of bituminous materials for comment and criticism prior to adoption by the Office.

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1. The purpose of this document is to provide information regarding the activities of the [redacted] in the [redacted] area. This information is being provided for your information and is not to be distributed outside of your office.

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Mr. Anderton and Mr. Pauls have prepared a summary of the construction and maintenance of the experimental roads in the vicinity of Washington to date.

Non-Bituminous Road Material Investigations.

Testing work in the Physical Laboratory in June was confined mainly to the routine testing of a large number of samples.

Detailed plans were made for a field investigation of rock quarrying, crushing and screening plants in the New England and Middle Atlantic States for the purpose of securing data for a bulletin upon the commercial quarrying, crushing and screening of rock for road building purposes and also to enable the Office to prepare tentative specifications for standard sizes of commercial broken stone for highway work.

A paper upon "The Effect of Controllable Variables upon the Toughness Test" was presented at the Atlantic City meeting of the American Society for Testing Materials by Mr. Jackson.

Soil Pressure Investigations.

A paper by Mr. Goldbeck upon "The Distribution of Pressures Through Earth Fills" was presented by Mr. Jackson before the American Society for Testing Materials at Atlantic City. Since the preparation of this paper by Mr. Goldbeck a number of measurements have been made of the distribution of pressures back of retaining walls and typical curves have been prepared from the results obtained. Engineers of the Office particularly interested in this phase of the work may secure these results upon application.

Cooperative work with the Miami Conservancy District on the measurement of lateral pressures due to liquid clay fills is being pushed, and a standpipe for holding the fill is now in process of erection. It is expected that preliminary tests will be run soon.

DRAINAGE INVESTIGATIONS.

Administration.

S. H. McCrory, Chief, returned to Washington on June 18, after two days in Peoria and Chicago, Illinois, devoted to selection of locations for continuing the investigation of drainage pumping plants. On June 19 and 20 he conferred with Guy L. Smith at Statesville and with F. R. Baker at Raleigh, regarding the investigations of ditch maintenance in North Carolina. He explained to groups of interested parties at Onawa, Iowa, on June 25 and 28, the drainage plans prepared by this Office for the Monona-Harrison District. At Webster City, Iowa, he conferred with D. L. Yarnell, June 26-27, regarding the studies of flow in drain tile. He visited F. W. Stanley on July 13-14, and examined the experimental irrigation work being done at Vineland, N. J.

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J. C. Carpenter was transferred from the Drainage Division, on June 19, to the Federal Aid highway work under district engineer H. K. Bishop.

Construction, Operation and Maintenance.

Field work for the investigation of maintenance methods and costs for drainage ditches has been completed in Drainage District No. 9 near Burdette, Arkansas, by O. G. Baxter and H. E. Middleton; on Third and Fourth Creeks near Statesville, N. C., by Guy L. Smith; by D. G. Miller in Iowa, on Kossuth Co. Ditch No. 83 near Algona, and on the Castner-Williams-Ashland Drain No. 4 near Webster City. The reports will be prepared at the Little Rock, Raleigh, and South Chicago offices, respectively.

The field studies of results from completed drainage ditches in Georgia and South Carolina were completed by P. T. Simons, who has returned to Washington to arrange the data for a report.

An inspection of new and old drainage pumping plants in the Upper Mississippi Valley is being made by L. A. Jones, with the object of securing more complete data regarding the operation of such plants than it has been possible to secure heretofore.

Report received:

Construction of a Dredge Ditch through Peat Soils, by G. R. Boyd.

Peat, Turf and Muck.

The investigation of subsidence of muck soils when drained has been continued in Florida, by F. E. Staebner.

Organization, Financing, and Legal Regulation.

A study of methods of distributing the cost of drainage district improvements has been begun by H. S. Yohe and George R. Boyd, in Wisconsin. Investigation will be made of the methods of making and collecting the assessments and of laws and court decisions affecting the principles and methods of making such assessments. Most of the field work will be in the central States and probably will require about 3 months.

Run-Off.

The collection of run-off data in the vicinity of Jackson, Tenn., and Missouri Valley, Iowa, under the direction of Charles E. Ramser, has been continued.

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Farm Drainage.

The field investigation of flow in tile drains, by D. L. Yarnell, has been completed for this season. The data secured have been exceedingly disappointing, due to lack of heavy rains which were necessary to give large flow in the drains. Charles Lawrence has resumed the experimental work on this investigation at Arlington Farm, Va.

The study of control of groundwater fluctuations by tile drains, near Whitehall and Yemassee, S. C., were continued by Messrs. Eason and Frescoln. More tile drains and more observation wells were installed at both places.

The investigation of vertical drains and ditching plows, by Fred F. Shafer, has been continued in Michigan, Indiana, Illinois, Wisconsin, and Minnesota.

W. A. Kelly has submitted a report upon the investigations he has been conducting in Enlarged Drainage Improvement District No. 2 at Granger, Wash.

Reports transmitted:

Eleven farm survey reports have been transmitted to the landowners since the last News-Letter was issued.

Overflowed Lands.

Reports received:

Proposed Brushy Creek Drainage District, Madison County, Georgia, by J. V. Phillips.

Proposed Long Creek Drainage District, Oglethorpe County, Georgia, by J. V. Phillips.

Pond Creek and Dry Creek Project, Colbert County, Alabama, by G.A. Hart, and L. A. Jones.

Reports transmitted:

Proposed Sugar Creek Drainage District, Morgan County, Georgia, by J. V. Phillips.

Mud Creek Bottoms, Jackson County, Alabama, by L. A. Jones and G.A. Hart.

Ross Drainage District, Clark County, Arkansas, by O. G. Baxter.

Page 1

The first part of the report deals with the general situation of the country and the progress of the work during the year. It is followed by a detailed account of the various projects and the results achieved.

The second part of the report deals with the financial aspects of the work. It gives a detailed account of the income and expenditure for the year and shows how the budget has been managed.

The third part of the report deals with the personnel of the organization. It gives a detailed account of the staff and their work and shows how the organization has managed to maintain a high standard of efficiency.

The fourth part of the report deals with the future prospects of the organization. It gives a detailed account of the plans for the next year and shows how the organization is prepared to meet the challenges ahead.

Yours faithfully,

John Doe, Secretary

Enclosure

Very truly yours,

John Doe, Secretary

Very truly yours,

Yours faithfully,

John Doe, Secretary

Very truly yours,

John Doe, Secretary

Swamp Lands.

Report Received:

Wambaw Swamp, Charleston and Berkeley counties, S. C., by S.W. Frescoln.

Reports transmitted:

Back Swamp, Florence County, S. C., by F. G. Eason.

Storm Tides on the Central Gulf Coast, by C. W. Okey.

Irrigation in Humid Region.

The construction and installation of the clay and concrete irrigation pipe on the experimental tract at Vineland, N. J., by F. W. Stanley and G. A. Mitchell, has been completed. It is expected that this pipe, made by wrapping vitrified tile with wire and laying it in wet concrete, will prove a more economical means of distribution for many conditions than any method now in use.

IRRIGATION INVESTIGATIONS.

Administration.

22.

Mr. Fortier returned from his inspection trip to the southwestern field late in June and left again early in July on a trip which will take him to the Northwest and California. He expects to be in the field the remainder of the summer.

A continuation of cooperative work in several States has been determined upon by Mr. Page, and agreements with the following agencies have been drawn up: California State engineering department and Agricultural Experiment Station, covering irrigation investigations only; Colorado Experiment Station, covering irrigation and drainage investigations; New Mexico Experiment Station, covering drainage investigations only; Texas State Board of Water Engineers, covering duty of water experiments; the Kansas Experiment Station, covering duty of water and pumping experiments, which are expected to conclude with the present season; Utah Experiment Station, covering duty of water, drainage, and pumping experiments.

Utilization of Water.

Unusually good weather conditions permitted the continuance and extension of the evaporation experiments at the Denver laboratory, and good results also were secured from the evaporation tanks located at different points on Jefferson Lake. The tank for the measurement of water movements through soils has been set up and put in operation. R. B. Sleight, A. I. E., in charge of the experiments, spent a week at a storage reservoir at an elevation of about 10,000 feet obtaining evaporation records.

Experiments in progress for several months at Riverside, California, in the investigation of the movement of water in soils have been terminated and the equipment has been shipped to Berkeley, where a new set of experiments will be started by W. W. McLaughlin, I. E. A report on the Riverside experiments is in preparation.

F. L. Bixby, I. E., has submitted a report of the cooperative investigations in Nevada on duty of water and pumping during 1916.

Appliances and Equipment.

E. J. Hoff, Mechanician, has begun a series of experiments at Berkeley, California, to devise accurate current meters and other measuring apparatus which will eliminate the disadvantages of instruments now in use. Mr. Hoff returned recently from a trip to Fort Collins, Colorado, where he went over the equipment now in use in the Poudre Valley and other investigations.

Flow of Water.

F. C. Scobey, I. E., T. H. McCarthy, A. I. E., and E. C. Fortier, I. A., are in Montana engaged on a new set of experiments on the flow of water in metal pipes.

Measurement of Water.

Professor E. W. Schoder and L. W. Turner, collaborators, have finished their experiments with the 5-foot rectangular Venturi flume at the hydraulic laboratory of Cornell University, and have recommended experiments with flumes of other sizes. A report on the experiments already made is in preparation.

Customs, Regulations and Laws.

F. G. Harden, I. E., arrived in Salt Lake City early in June to begin a study of various questions relating to the organization of drainage districts and public control of waters used for irrigation. In addition to Utah this season's investigations will include Idaho, Wyoming, and Montana. Dr. Fortier, Mr. Harden, and L. M. Winsor, Agent, were in conference with the members of the Utah State water rights commission from June 11 to June 14, regarding proposed cooperation in investigating water conditions and legislation in Utah and other States.

W. A. Hutchins, A. I. E., has prepared an abstract of legislation relating to irrigation districts, passed by the California Legislature at its last session, for insertion in the California irrigation district report.

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Drainage of Irrigated Lands.

Work on the Truckee Meadows survey, in Nevada, was begun during June, following a conference at Reno between R. A. Hart, S. D. E., F. L. Bixby, I.E., and representatives of the State engineering department. The project comprises many thousands of acres and involves river control as well as under-drainage.

RURAL ENGINEERING.

The following designs and work in connection with them have either been completed or are in progress:

Drawings for a general barn reported last month as in pencil.
(Not yet checked).

Drawings for a hollow tile feed barn for the Republic of Grove City, Pa.

Pencil drawings for a brick silo for the Work House at Occoquan, also bill of materials.

Bill of materials for the Community House reported last month.

Hot water heating system for Community House.

Plans for the Berry School water system, Rome, Georgia.

Drawings and bill of materials for a homemade water heater for Dairy Division.

Typical drawings and bills of materials for brick silos of various capacities.

Preparation of a farmstead layout suited to conditions in vicinity of Belhaven, N. C., where hogs, beef cattle, and corn raising are major industries.

Correspondence and consultations were handled on the following subjects:

- Ice House Design and Construction.
- Refrigeration and Cooling Systems.
- Water Supply and Storage.
- Farm Electric Light and Power Plants.
- Power Development from Streams.
- Gas and Alcohol Engines.
- Tractors.
- Inventions of Various Kinds.
- Land Clearing.

Miscellaneous:

Mr. McCormick made a trip investigating conditions among manufacturers of tractors.

Question forms requesting data on tractors and trucks were sent out, the incoming data being tabulated and filed.

Assistance was given the Bureau of Plant Industry in the selection and purchase of an experimental gasoline engine driven spraying outfit.

W. R. Humphries spent several days investigating conditions in the vicinity of Belhaven, N. C., particularly those on property of Carl M. Owen with a view to the preparation of a farmstead layout suited to Mr. Owen's needs and to obtain information to be used for general distribution.

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